

INFORMATION SHEET

ORDER NO. R5-2004-_____
NPDES NO. CA0079235
SEWERAGE COMMISSION-OROVILLE REGION
WASTEWATER TREATMENT PLANT
BUTTE COUNTY

GENERAL INFORMATION

The Sewerage Commission-Oroville Region operates a wastewater treatment plant in Section 25, T19N, R4E, MDB&M. The treatment plant presently treats an average dry weather flow of 3.2 mgd. Treated effluent is discharged to the Feather River in Section 19, T19N, R4E, MDB&M (Discharge 001).

Liquid treatment processes at the plant include raw sewage screening for removal of large solids, grit removal, primary clarification, activated sludge treatment with secondary clarification, filtration, and chlorination/dechlorination. Sludge is treated using aerobic digestion for primary and secondary sludge and lagoon dewatering of secondary sludge. Dried sludge is taken to a Class III landfill for disposal.

TYPE AND QUANTITY OF WASTE DISCHARGED

The discharger treats an average dry weather flow of approximately 3.2 mgd of municipal wastewater. The waste is treated by biological treatment. The report of waste discharge and reports submitted by the Discharger describe the discharge as follows:

Design Average Dry Weather Flow: 6.5 mgd
Average Daily Dry Weather Flow: 3.2 mgd
Peak Day Wet Weather Flow: 8.9 mgd
Average Temperature: 76°F Summer; 65°F Winter

<u>Constituent</u>	<u>mg/L</u>	<u>lbs/day^b</u>
BOD ₅ ^a	3.1	83
Total Suspended Solids	1.2	32

^a5-day, 20°C biochemical oxygen demand

^bBased on a current average dry weather flow of 3.2 mgd

REASONABLE POTENTIAL ANALYSIS

Federal regulations contained at 40 CFR 122.4 (d) require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. USEPA adopted the National Toxics Rule (NTR) on 22 December 1992, which was amended on 4 May 1995, and 9 November 1999, and the California Toxics Rule (CTR) on 18 May 2000. The NTR and CTR contain water quality standards applicable to this discharge. The State Water

Resources Control Board (SWRCB) adopted the *Policy for Implementation of Toxics Standards for Inland Surface waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP), which contains guidance on implementation for the NTR and CTR.

The Discharger completed sampling required by the SIP and has submitted the results of this sampling. A determination was made that there is reasonable potential to cause or contribute to an in-stream excursion above the water quality standards for copper, zinc, and tetrachloroethene. Development of effluent limits for these constituents are presented below. There were a small number of effluent sample results that were discarded as not being representative of the effluent or receiving water. These were as follows: silver detected at 2.2 ug/L in the effluent and at 1 ug/L in the receiving water, all other effluent sample results were below CTR criteria and receiving water sample results were non detect or below reporting limits; lead was detected in initial effluent samples, but it was determined that clean sampling techniques were not employed, subsequent sample results were below CTR criteria; bis(2-Ethylhexyl)phthalate detected, but not quantified at 7 ug/L, all other sample results were non-detect; Lindane detected at 0.02 ug/L, all other samples at non-detect; Chlordane detected, but not quantified at 0.009 ug/L, all other samples were non-detect; Dieldrin at 0.01 ug/L, all other samples were non-detect; and Heptachlor Epoxide detected, but not quantified at 0.048, all other samples were at non-detect. This order includes quarterly monitoring for silver and lead in the first year of the permit cycle to determine if there is a reasonable potential to cause or contribute to an in-stream excursion above the water quality standard.

BASIS FOR PERMIT CONDITIONS

Metals Translators

Water quality criteria and objectives for metals in the CTR and Basin Plan are presented as dissolved concentrations. Lacking site-specific data, the USEPA recommends conversion factors (translators) to translate dissolved concentrations to total concentrations. The conversion factor for copper in freshwater is 0.960 for both the acute and the chronic criteria. The conversion factors for zinc in freshwater are 0.978 for the acute and 0.986 for the chronic criteria.

Mixing Zone Study and Dilution Credit

The Discharger's consultant conducted a mixing zone study using the CORMIX GI version 4.1 Hydrodynamic Mixing Zone Model to mathematically model effluent discharges from the wastewater treatment plant to the Feather River. The mixing zone modeling results indicated the discharge meets the definition of a completely mixed discharge as contained in the SIP. On the basis of the mixing zone study the Discharger requested a dilution credit of 92 for acute criteria and 121 for chronic criteria.

SWRCB Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California*, requires the Regional Board to maintain high quality waters of the state

unless it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies. The dilution credits requested by the Discharger would result in effluent limits that are extremely high in comparison with measured levels in the Discharger's effluent. Using these dilution credits would grant 100 percent of the assimilative capacity of the river to this discharge, eliminating the ability to allow existing or potential downstream discharges without water quality objectives being exceeded. The Regional Board, therefore, is granting a portion of the requested dilution credit in an effort to maintain the quality of the Feather River at the current levels and reserve a portion of the river's assimilative capacity for other discharges. A dilution credit of 20:1 for acute and human health criteria and 26:1 for chronic criteria will result in effluent limits that more reasonably represent current levels in the Discharger's effluent and thus are used to develop effluent limits for copper, zinc and tetrachloroethene in this order.

Effluent Limitations

Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD) Limits:

Federal regulations, 40 CFR, part 133, provide technology based effluent limitation for BOD and TSS. Pursuant to the regulations at 40 CFR Sections 133.102(a), and (b), the BOD and TSS 30 day average discharge limit for secondary treatment systems shall not exceed 30 mg/L, the 7 day average shall not exceed 45 mg/L, and the 30 day BOD percent removal shall not be less than 85 percent.

The previous permit called for monthly average effluent limits for BOD and TSS of 20 mg/L, weekly average limits of 25 mg/L, daily maximum limit of 40 mg/L, and a monthly average removal rate of 85 percent. These limits remain the same in this permit. The discharger has had success meeting these limits.

Chlorine Residual:

The Basin Plan prohibits the discharge of toxic materials in toxic concentrations. Chlorine is used for disinfection of the effluent waste stream. Chlorine can cause toxicity to aquatic organisms when discharged to surface waters. USEPA recommends, in their *Ambient Water Quality Criteria for the Protection of Fresh Water Aquatic Life*, that chlorine concentrations not exceed 0.02 mg/L as a 1-hour average and 0.01 mg/L as a 4-day average. The use of chlorine as a disinfectant in the wastewater treatment process presents a reasonable potential that it could be discharged in toxic concentrations. An effluent limitation for chlorine has been included in the Order to protect the receiving stream aquatic life beneficial uses. The effluent limitation has been established at the USEPA recommended ambient water quality criteria for chlorine. The one-hour average limitation, rather than an instantaneous or daily maximum, will be applied for compliance determinations. A one-hour average limitation allows for continuous monitoring anomalies while protecting aquatic organisms against toxicity.

The Discharger has installed additional monitoring and control systems to help prevent violations of the effluent chlorine limit. These systems include the following: monitoring of the sulfur dioxide concentration in the final effluent after dechlorination; a system of maintenance that keeps the chlorine analyzer calibrated and increases the reliability of that instrument; and a control system that will automatically shut down the effluent pumps that is activated if the detected level of sulfur dioxide falls below 0.1 mg/L or a measured chlorine residual exceeds 0.02 mg/L. The additional monitoring of sulfur dioxide will provide confirmation that no chlorine is being discharged during periods of calibration, maintenance, repair or malfunction of the chlorine residual analyzer.

Total Coliform Organisms:

This Order requires a monthly median total coliform limit of 23 MPN/100 mL and a daily maximum limit of 500 MPN/100 mL for effluent discharged to the Feather River. This level is thought to be adequately protective of beneficial uses and is consistent with the previous permit.

pH:

The Basin Plan provides that the pH of surface waters shall not be depressed below 6.5 nor raised above 8.5 nor shall the discharge alter pH of the receiving water more than 0.5 units. Federal regulations at 40 CFR 133.102(c) describes the minimum level of effluent quality to be attained by secondary treatment facilities for pH to be within 6.0 and 9.0 units. This Order requires the pH of the effluent to be maintained within the limits of 6.0 and 9.0 pH units.

Flow Limits:

The monthly average daily dry weather flow limit of 6.5 mgd is based on the design capacity of the treatment facility.

Copper:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR standards for copper; therefore, effluent limitations for copper are included in the Order. Effluent results submitted by the Discharger are summarized in Table IS-1.

Table IS-1 – Total Copper Concentrations (ug/L)

Date	WPCP Effluent	Feather River	River Hardness
7/11/01	0.7 DNQ	1.3 ^b	43
12/10/01	12	2.8 ^b	52
1/23/02	15	10 ^b	44
3/11/02	6.3	19 ^b	45
7/16/02	7.2	0.8 DNQ ^b	40
1/28/03	9	2.8 ^b	41
12/8/03	6.8	ND, MDL = 0.5	--
3/8/04	--	0.72	--
Average	8.1	0.61	44
Minimum	0.7	0.5	40
Maximum	15	0.72	52
Coefficient of Variation ^a	0.6	--	--

^a Default C_v in SIP for number of samples less than 10 is 0.6

^b Sampling and analysis not performed with “clean” techniques. Values suspect.

As noted, the initial samples were taken and analyzed without using clean sampling techniques. The Discharger was asked to conduct additional sampling using techniques to achieve low level results. The results of this sampling are shown in Table IS-1.

Copper toxicity is hardness dependent. For a hardness of 40 mg/L, the CTR criteria for copper are presented in Table IS-2.

Table IS-2 – Receiving Water Criteria/Objectives for Copper

Basis	Dissolved (ug/L)	Total Recoverable (ug/L)
CTR _{CCC}	4.09	4.26
CTR _{CMC}	5.67	5.91

Criteria are for river hardness = 40 mg/L

The CTR Criteria for copper were not exceeded in the Feather River samples analyzed over the period from July 2001 to March 2004 (as indicated by subsequent discharger sampling). Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for copper for discharge 001:

Step 1: Applicable water quality criteria (C)

CTR criteria are a function of receiving water hardness and are given by the following equation for criterion continuous concentration (CCC) and criterion maximum concentration (CMC):

$$\text{CCC (chronic)} = e^{(0.8545 \cdot \ln(\text{hardness}) - 1.702)} * (0.960) \text{ as dissolved fraction}$$

$$\text{CMC (acute)} = e^{(0.9422 \cdot \ln(\text{hardness}) - 1.7)} * (0.960) \text{ as dissolved fraction}$$

The minimum hardness of 40 mg/L gives the following dissolved criteria:

$$\text{CCC} = 4.09 \text{ ug/L}$$

$$\text{CMC} = 5.67 \text{ ug/L}$$

Applying the translator of 0.960 for chronic and acute:

$$\text{CCC} = 4.26 \text{ ug/L}$$

$$\text{CMC} = 5.9 \text{ ug/L}$$

Step 2: Calculate the ECA

$$\text{ECA} = \text{Effluent Concentration Allowance} = C + D * (C - B)$$

Where D = dilution credit and B = background

$$D_{\text{CCC}} = 26, D_{\text{CMC}} = 20$$

$$\text{ECA}_{\text{CCC}} = 4.26 + 26 * (4.26 - 0.5) = 102 \text{ ug/L}$$

$$\text{ECA}_{\text{CMC}} = 5.9 + 20 * (5.9 - 0.5) = 114 \text{ ug/L}$$

Step 3: Determine long-term average (LTA)

$$C_V = 0.6; \text{ECA multiplier}_{\text{chronic99}} = 0.527$$

$$\text{ECA multiplier}_{\text{acute99}} = 0.321$$

$$\text{LTA}_{\text{CCC}} = 102 * 0.527 = 53.8 \text{ ug/L}$$

$$\text{LTA}_{\text{CMC}} = 114 * 0.321 = 36.6 \text{ ug/L}$$

Step 4: Select lowest LTA

$$LTA_{CMC} = 36.6 \text{ ug/L}$$

Step 5: Calculate water quality based effluent limits

$$C_V = 0.6; \text{AMEL multiplier}_{95} = 1.55 \text{ (n=4 for less than 4 samples per month)}$$

$$MDEL \text{ multiplier}_{99} = 3.11$$

$$\text{Average Monthly Effluent Limit} = 36.6 * 1.55 = 57 \text{ ug/L}$$

$$\text{Maximum Daily Effluent Limit} = 36.6 * 3.11 = 110 \text{ ug/L}$$

Zinc:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR standards for zinc; therefore, effluent limitations for zinc are included in the Order. Effluent results submitted by the Discharger are summarized in Table IS-3.

Table IS-3 – Total Zinc Concentrations (ug/L)

Date	WWTP Effluent	Feather River	River Hardness
7/11/01	52	14	43
12/10/01	28	24	52
1/23/02	60	30	44
3/11/02	50	20	45
7/16/02	40	1.0 DNQ	40
1/28/03	60	30	41
Average	48	19.8	44
Minimum	28	1.0	40
Maximum	60	30	52
Coefficient of Variation ^a	0.6	--	--

^a Default C_V in SIP for number of samples less than 10 is 0.6

Zinc toxicity is hardness dependent. For a hardness of 40 mg/L (from DWR data), the CTR for zinc are presented in Table IS-4.

Table IS-4 – Receiving Water Criteria/Objectives for Zinc

Basis	Dissolved (ug/L)	Total Recoverable (ug/L)
CTR _{CCC}	54.4	55.1
CTR _{CMC}	53.9	55.1

Criteria are for river hardness = 40 mg/L

The CTR Criteria and Basin Plan objective for zinc were not exceeded in the Feather River samples analyzed over the period from July 2001 to October 2002. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for zinc at discharge 001:

Step 1: Applicable water quality criteria (C)

CTR criteria are a function of receiving water hardness and are given by the following equation for criterion continuous concentration (CCC) and criterion maximum concentration (CMC):

$$\text{CCC (chronic)} = e^{(0.8473 \cdot \ln(\text{hardness}) + 0.884)} * (0.986) \text{ as dissolved fraction}$$

$$\text{CMC (acute)} = e^{(0.8473 \cdot \ln(\text{hardness}) + 0.884)} * (0.978) \text{ as dissolved fraction}$$

Using the minimum hardness of 40 mg/L gives the following dissolved criteria:

$$\text{CCC} = 54.4 \text{ ug/L}$$

$$\text{CMC} = 53.9 \text{ ug/L}$$

Applying the translator of 0.986 for chronic and 0.978 for acute:

$$\text{CCC} = 55.1 \text{ ug/L}$$

$$\text{CMC} = 55.1 \text{ ug/L}$$

Step 2: Calculate the ECA

$$ECA = \text{Effluent Concentration Allowance} = C + D * (C-B)$$

Where D = dilution credit and B = background

$$D_{CCC} = 26, D_{CMC} = 20$$

$$ECA_{CCC} = 55.1 + 26 * (55.1-30) = 708 \text{ ug/L}$$

$$ECA_{CMC} = 55.1 + 20 * (55.1-30) = 557 \text{ ug/L}$$

Step 3: Determine long-term average (LTA)

$$C_V = 0.6; ECA \text{ multiplier}_{\text{chronic99}} = 0.527$$

$$ECA \text{ multiplier}_{\text{acute99}} = 0.321$$

$$LTA_{CCC} = 708 * 0.527 = 373 \text{ ug/L}$$

$$LTA_{CMC} = 557 * 0.321 = 179 \text{ ug/L}$$

Step 4: Select lowest LTA

$$LTA_{CMC} = 179 \text{ ug/L}$$

Step 5: Calculate water quality based effluent limits

$$C_V = 0.6; AMEL \text{ multiplier}_{95} = 1.55 \text{ (n=4 for less than 4 samples per month)}$$

$$MDEL \text{ multiplier}_{99} = 3.11$$

$$\text{Average Monthly Effluent Limit} = 179 * 1.55 = 280 \text{ ug/L}$$

$$\text{Maximum Daily Effluent Limit} = 179 * 3.11 = 560 \text{ ug/L}$$

Tetrachloroethene:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR human health criterion for tetrachloroethene; therefore, effluent limitations for tetrachloroethene are included in the Order. Effluent results submitted by the Discharger are summarized in Table IS-5. The CTR human health criterion for tetrachloroethene is 0.8 ug/L.

Table IS-5 – Tetrachloroethene Concentrations (ug/L)

Date	WPCP Effluent	Feather River
7/23/01	1	ND, MDL = 0.08
10/30/01	0.81	ND, MDL = 0.08
1/28/02	ND, MDL = 0.11	4.6 ^b
4/8/02	ND, MDL = 0.11	0.32 DNQ
7/30/02	ND, MDL = 0.11	ND, MDL = 0.11
10/28/02	0.47	ND, MDL = 0.11
Average	<0.44	0.14
Minimum	0.11	<0.11
Maximum	1.0	0.32
Coefficient of Variation ^a	0.6	--

^a Default C_v in SIP for number of samples less than 10 is 0.6

^b Disregarded as not representative of effluent, average of other sample results = 0.14

The CTR criterion for tetrachloroethene was not exceeded in the Feather River samples analyzed over the period from July 2001 to January 2003. Dilution credits will be allowed as presented in the SIP. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for tetrachloroethene at discharge 001:

Step 1: Applicable water quality criteria (C)

CTR human health criteria for consumption of water and organisms:

$$C = 0.8 \text{ ug/L}$$

Step 2: Calculate the ECA

$$ECA = \text{Effluent Concentration Allowance} = C + D * (C - B)$$

Where D = dilution credit and B = background

$$D = 20$$

$$ECA = 0.8 + 20 * (0.8 - 0.14) = 14 \text{ ug/L}$$

Step 3: N/A

Step 4: N/A

Step 5: Calculate water quality based effluent limits

$$\text{AMEL} = \text{ECA} = 14$$

$$\text{Average Monthly Effluent Limit} = 14 \text{ ug/L}$$

$$C_V = 0.6; \text{MDEL}_{99}/\text{AMEL}_{95} \text{ multiplier} = 2.01 \text{ (n=4 for less than 4 samples per month)}$$

$$\text{Maximum Daily Effluent Limit} = 14 * 2.01 = 28 \text{ ug/L}$$

Toxicity Limits:

The Basin Plan requires that all waters be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This Order contains an acute toxicity effluent limit which states, "Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay -----70%

Median for any three or more consecutive bioassays -----90%"

The monitoring and reporting program requires analysis for pH and temperature to be performed concurrent to each monthly acute toxicity bioassay. This Order also contains annual monitoring for chronic toxicity.

SLUDGE DISPOSAL

This Order contains provisions requiring the Discharger to comply with current federal and state laws and regulations for disposal of sewage sludge. The Discharger is required to report any proposed change in sludge use or disposal practice **90 days** in advance of change.

RECEIVING WATER LIMITATIONS

The receiving water limitations contained in this Order are based on water quality objectives contained in the Basin Plan for the Feather River.

PROCEDURES ON REACHING FINAL DECISION ON DRAFT PERMIT

The tentative waste discharge requirements have been sent to the Discharger and interested parties for review (at least 30 days) prior to formal presentation to the Regional Board. Any contested items on the permit will be heard and considered for change prior to formal adoption at the Board Meeting.

For further information or questions regarding the NPDES permit, contact Nolan Randall at the Regional Water Quality Control Board in Redding at (530) 224-4801.